



## SEQUENCE LISTING

&lt;110&gt; EXELIXIS, INC.

&lt;120&gt; INSECT P53 TUMOR SUPPRESSOR GENES AND PROTEINS

&lt;130&gt; EX00015C FIRST AMENDMENT

&lt;140&gt; US 09/524,101

&lt;141&gt; 2000-03-13

&lt;150&gt; US 09/268,969

&lt;151&gt; 1999-03-16

&lt;150&gt; US 60/184,373

&lt;151&gt; 2000-02-23

&lt;160&gt; 32

&lt;170&gt; PatentIn version 3.1

&lt;210&gt; 1

&lt;211&gt; 1573

&lt;212&gt; DNA

&lt;213&gt; Drosophila melanogaster

&lt;400&gt; 1

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TECH CENTER 1600/2900

JAN 14 2002

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 <212> PRT  
 <213> Drosophila melanogaster

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 35 40 45

Gln Gly Leu Asn Ser Gly Asn Leu Met Gln Phe Ser Gln Gln Ser Val  
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Leu Arg Glu Met Met Leu Gln Asp Ile Gln Ile Gln Ala Asn Thr Leu  
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Pro Lys Leu Glu Asn His Asn Ile Gly Gly Tyr Cys Phe Ser Met Val  
 85 90 95

Leu Asp Glu Pro Pro Lys Ser Leu Trp Met Tyr Ser Ile Pro Leu Asn

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105

110

Lys Leu Tyr Ile Arg Met Asn Lys Ala Phe Asn Val Asp Val Gln Phe  
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Lys Ser Lys Met Pro Ile Gln Pro Leu Asn Leu Arg Val Phe Leu Cys  
 130 135 140

Phe Ser Asn Asp Val Ser Ala Pro Val Val Arg Cys Gln Asn His Leu  
 145 150 155 160

Ser Val Glu Pro Leu Thr Ala Asn Asn Ala Lys Met Arg Glu Ser Leu  
 165 170 175

Leu Arg Ser Glu Asn Pro Asn Ser Val Tyr Cys Gly Asn Ala Gln Gly  
 180 185 190

Lys Gly Ile Ser Glu Arg Phe Ser Val Val Val Pro Leu Asn Met Ser  
 195 200 205

Arg Ser Val Thr Arg Ser Gly Leu Thr Arg Gln Thr Leu Ala Phe Lys  
 210 215 220

Phe Val Cys Gln Asn Ser Cys Ile Gly Arg Lys Glu Thr Ser Leu Val  
 225 230 235 240

Phe Cys Leu Glu Lys Ala Cys Gly Asp Ile Val Gly Gln His Val Ile  
 245 250 255

His Val Lys Ile Cys Thr Cys Pro Lys Arg Asp Arg Ile Gln Asp Glu  
 260 265 270

Arg Gln Leu Asn Ser Lys Lys Arg Lys Ser Val Pro Glu Ala Ala Glu  
 275 280 285

Glu Asp Glu Pro Ser Lys Val Arg Arg Cys Ile Ala Ile Lys Thr Glu  
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Asp Thr Glu Ser Asn Asp Ser Arg Asp Cys Asp Asp Ser Ala Ala Glu  
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Trp Asn Val Ser Arg Thr Pro Asp Gly Asp Tyr Arg Leu Ala Ile Thr  
 325 330 335

Cys Pro Asn Lys Glu Trp Leu Leu Gln Ser Ile Glu Gly Met Ile Lys  
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Glu Ala Ala Ala Glu Val Leu Arg Asn Pro Asn Gln Glu Asn Leu Arg  
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Pro  
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 <212> DNA  
 <213> Leptinotarsa decemlineata

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<212> PRT  
<213> Leptinotarsa decemlineata

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Asp Glu Pro Thr Leu Asn Asp Leu Asn Tyr Ser Asn Ile Leu Asn Gly  
35 40 45

Ser Ile Val Ala Asn Asp Asp Ser Lys Met Val His Leu Ile Phe Pro  
50 55 60

Gly Val Gln Thr Ser Val Pro Ser Asn Asp Glu Tyr Asp Gly Pro Tyr  
65 70 75 80

Glu Phe Glu Val Asp Val His Pro Thr Val Ala Lys Asn Ser Trp Val  
85 90 95

Tyr Ser Thr Thr Leu Asn Lys Val Tyr Met Thr Met Gly Ser Pro Phe  
100 105 110

Pro Val Asp Phe Arg Val Ser His Arg Pro Pro Asn Pro Leu Phe Ile  
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Arg Ser Thr Pro Val Tyr Ser Ala Pro Gln Phe Ala Gln Glu Cys Val  
130 135 140

Tyr Arg Cys Leu Asn His Glu Phe Ser His Lys Glu Ser Asp Gly Asp  
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Leu Lys Glu His Ile Arg Pro His Ile Ile Arg Cys Ala Asn Gln Tyr  
165 170 175

Ala Ala Tyr Leu Gly Asp Lys Ser Lys Asn Glu Arg Leu Ser Val Val  
180 185 190

Ile Pro Phe Gly Ile Pro Gln Thr Gly Thr Glu Ser Val Arg Glu Ile  
195 200 205

Phe Glu Phe Val Cys Lys Asn Ser Cys Pro Ser Pro Gly Met Asn Arg  
 210 215 220

Arg Ala Val Glu Ile Ile Phe Thr Leu Glu Asp Asn Gln Gly Thr Ile  
 225 230 235 240

Tyr Gly Arg Lys Thr Leu Asn Val Arg Ile Cys Ser Cys Pro Lys Arg  
 245 250 255

Asp Lys Glu Lys Asp Glu Lys Asp Asn Thr Ala Asn Thr Asn Leu Pro  
 260 265 270

His Gly Lys Lys Arg Lys Met Glu Lys Pro Ser Lys Lys Pro Met Gln  
 275 280 285

Thr Gln Ala Glu Asn Asp Thr Lys Glu Phe Thr Leu Thr Ile Pro Leu  
 290 295 300

Val Gly Arg His Asn Glu Gln Asn Val Leu Lys Tyr Cys His Asp Leu  
 305 310 315 320

Met Ala Gly Glu Ile Leu Arg Asn Ile Gly Asn Gly Thr Glu Gly Pro  
 325 330 335

Tyr Lys Ile Ala Leu Asn Lys Ile Asn Thr Leu Ile Arg Glu Ser Ser  
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Glu Trp

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 <211> 1291  
 <212> DNA  
 <213> Tribolium castaneum

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 <212> PRT  
 <213> Tribolium castaneum

<400> 6

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Glu Asn Asn Val His Leu Val Asn Asp Asp Gly Glu Glu Glu Lys Tyr  
35 40 45

Ser Asn Glu Ala Asn Tyr Thr Glu Ser Ile Phe Pro Pro Asp Gln Pro  
50 55 60



Thr Asn Leu Gly Thr Glu Glu Tyr Pro Gly Pro Phe Asn Phe Ser Val  
 65 70 75 80

Leu Ile Ser Pro Asn Glu Gln Lys Ser Pro Trp Glu Tyr Ser Glu Lys  
 85 90 95

Leu Asn Lys Ile Phe Ile Gly Ile Asn Val Lys Phe Pro Val Ala Phe  
 100 105 110

Ser Val Gln Asn Arg Pro Gln Asn Leu Pro Leu Tyr Ile Arg Ala Thr  
 115 120 125

Pro Val Phe Ser Gln Thr Gln His Phe Gln Asp Leu Val His Arg Cys  
 130 135 140

Val Gly His Arg His Pro Gln Asp Gln Ser Asn Lys Gly Val Ala Pro  
 145 150 155 160

His Ile Phe Gln His Ile Ile Arg Cys Thr Asn Asp Asn Ala Leu Tyr  
 165 170 175

Phe Gly Asp Lys Asn Thr Gly Thr Arg Leu Asn Ile Val Leu Pro Leu  
 180 185 190

Ala His Pro Gln Val Gly Glu Asp Val Val Lys Glu Phe Phe Gln Phe  
 195 200 205

Val Cys Lys Asn Ser Cys Pro Leu Gly Met Asn Arg Arg Pro Ile Asp  
 210 215 220

Val Val Phe Thr Leu Glu Asp Asn Lys Gly Glu Val Phe Gly Arg Arg  
 225 230 235 240

Leu Val Gly Val Arg Val Cys Ser Cys Pro Lys Arg Asp Lys Asp Lys  
 245 250 255

Glu Glu Lys Asp Met Glu Ser Ala Val Pro Pro Arg Arg Lys Lys Arg  
 260 265 270

Lys Leu Gly Asn Asp Glu Arg Arg Val Val Pro Gln Gly Ser Ser Asp  
 275 280 285

Asn Lys Ile Phe Ala Leu Asn Ile His Ile Pro Gly Lys Lys Asn Tyr  
 290 295 300

Leu Gln Ala Leu Lys Met Cys Gln Asp Met Leu Ala Asn Glu Ile Leu  
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Lys Lys Gln Glu Gln Gly Gly Asp Asp Ser Ala Asp Lys Asn Cys Tyr  
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 <211> 508  
 <212> DNA  
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 gataagaacg ctgggaagag actgagta 508

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 <211> 169  
 <212> PRT  
 <213> Tribolium castaneum

<400> 8

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Ser Ser Tyr Leu Ser Ala Pro Ile Phe Pro Pro Ser Glu Pro Leu Glu

35

40

45

Leu Cys Asn Thr Glu Tyr Pro Gly Pro Leu Asn Phe Glu Val Phe Val  
50 55 60

Asp Pro Asn Val Leu Lys Asn Pro Trp Glu Tyr Ser Pro Ile Leu Asn  
65 70 75 80

Lys Ile Tyr Ile Asp Met Lys His Lys Phe Pro Ile Asn Phe Ser Val  
85 90 95

Lys Lys Ala Asp Pro Glu Arg Arg Leu Phe Val Arg Val Met Pro Met  
100 105 110

Phe Glu Glu Asp Arg Tyr Val Gln Glu Leu Val His Arg Cys Ile Cys  
115 120 125

His Glu Gln Leu Thr Asp Pro Thr Asn His Asn Val Ser Glu Met Val  
130 135 140

Ala Gln His Ile Ile Arg Cys Asp Asn Asn Asn Ala Gln Tyr Phe Gly  
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Asp Lys Asn Ala Gly Lys Arg Leu Ser  
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<211> 433  
<212> DNA  
<213> *Heliothis virescens*

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 <213> Heliothis virescens

<400> 10

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Lys Ala Pro His Met Phe Val Arg Ser Thr Val Val Phe Ser Asp Glu  
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Thr Gln Ala Glu Lys Arg Val Glu Arg Cys Val Gln His Phe His Glu  
 35 40 45

Ser Ser Thr Ser Gly Ile Gln Thr Glu Ile Ala Lys Asn Val Leu His  
 50 55 60

Ser Ser Arg Glu Ile Gly Thr Gln Gly Val Tyr Tyr Cys Gly Lys Val  
 65 70 75 80

Asp Met Ala Asp Ser Trp Tyr Ser Val Leu Val Glu Phe Met Arg Thr  
 85 90 95

Ser Ser Glu Ser Cys Ser His Ala Tyr Gln Phe Ser Cys Lys Asn Ser  
 100 105 110

Cys Ala Thr Gly Ile Asn Arg Arg Ala Ile Ala Ile Ile Phe Thr Leu  
 115 120 125

Glu Asp Ala Met Gly Asn Ile His Gly Arg Gln Lys Val Gly Ala Arg  
 130 135 140

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 <212> DNA  
 <213> Drosophila melanogaster

<400> 11  
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26

<210> 12  
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 <212> DNA  
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30

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<212> DNA  
<213> Drosophila melanogaster

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23

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<212> DNA  
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28

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<212> DNA  
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<212> DNA  
<213> Drosophila melanogaster

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<210> 18  
<211> 27425  
<212> DNA  
<213> Drosophila melanogaster

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ttaatgttaa	ttgcagctaa	ctggctthttg	ggtactthttg	ctthttaacgc	caaattgtgaa	27240
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taaatgggtg	aacttgatga	thttthtttht	tcatacaacg	ttatttaaag	tctattgctt	27360
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27425

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gccgatgtcg cggcgggaat agagcgattc gcagtccaaa cacgatgata aacccattg 180  
catccgagtc ggaggccatc aattcggcca cctatgtgga caactatata gattcgggtg 240  
aaaatctgcc ggacgacgtg cagcgccagt tgtcacgcat ccgcgacata gacgtccagt 300  
acagaggcct cattcgcgac gtagaccact actacgacct gtatctgtcc ctgcagaact 360  
ccgcggatgc cgggcgacgg tctcgaagca tctccaggat gcaccagagt ctcatcagg 420  
cgcaggaact gggcgacgaa aaaatgcaga tcgtcaatca tatgcaggag ataatcgacg 480  
gcaagctgcg ccagctggac accgaccagc agaacctgga cctgaaggag gaccgcatc 540  
ggtatgcgct cctggacgat ggcacgcctt cgaagctgca acgcctgcag agcccgatga 600  
gggagcaggg caaccaagcg ggcactggca acggtggcct aaatggaaac ggcctgcttt 660  
cggccaaaga tctgtacgcc ttgggcggct atgcaggtgg tgttgtgcct gggttctaatg 720  
ccatgacctc cggcaacggt ggcgggtcaa cgcaccaactc ggagcgctcg agccatgtca 780  
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 <212> PRT  
 <213> Drosophila melanogaster

<400> 20

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Tyr Val Asp Asn Tyr Ile Asp Ser Val Glu Asn Leu Pro Asp Asp Val  
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Gln Arg Gln Leu Ser Arg Ile Arg Asp Ile Asp Val Gln Tyr Arg Gly  
 35 40 45

Leu Ile Arg Asp Val Asp His Tyr Tyr Asp Leu Tyr Leu Ser Leu Gln  
 50 55 60

Asn Ser Ala Asp Ala Gly Arg Arg Ser Arg Ser Ile Ser Arg Met His  
 65 70 75 80

Gln Ser Leu Ile Gln Ala Gln Glu Leu Gly Asp Glu Lys Met Gln Ile  
 85 90 95

Val Asn His Met Gln Glu Ile Ile Asp Gly Lys Leu Arg Gln Leu Asp  
 100 105 110

Thr Asp Gln Gln Asn Leu Asp Leu Lys Glu Asp Arg Asp Arg Tyr Ala  
 115 120 125

Leu Leu Asp Asp Gly Thr Pro Ser Lys Leu Gln Arg Leu Gln Ser Pro  
 130 135 140

Met Arg Glu Gln Gly Asn Gln Ala Gly Thr Gly Asn Gly Gly Leu Asn  
145 150 155 160

Gly Asn Gly Leu Leu Ser Ala Lys Asp Leu Tyr Ala Leu Gly Gly Tyr  
165 170 175

Ala Gly Gly Val Val Pro Gly Ser Asn Ala Met Thr Ser Gly Asn Gly  
180 185 190

Gly Gly Ser Thr Pro Asn Ser Glu Arg Ser Ser His Val Ser Asn Gly  
195 200 205

Gly Asn Ser Gly Ser Asn Gly Asn Ala Ser Gly Gly Gly Gly Gly Glu  
210 215 220

Leu Gln Arg Thr Gly Ser Lys Arg Ser Arg Arg Arg Asn Glu Ser Val  
225 230 235 240

Val Asn Asn Gly Ser Ser Leu Glu Met Gly Gly Asn Glu Ser Asn Ser  
245 250 255

Ala Asn Glu Ala Ser Gly Ser Gly Gly Gly Ser Gly Glu Arg Lys Ser  
260 265 270

Ser Leu Gly Gly Ala Ser Gly Ala Gly Gln Gly Arg Lys Ala Ser Leu  
275 280 285

Gln Ser Ala Ser Gly Ser Leu Ala Ser Gly Ser Ala Ala Thr Ser Ser  
290 295 300

Gly Ala Ala Gly Gly Gly Gly Ala Asn Gly Ala Gly Val Val Gly Gly  
305 310 315 320

Asn Asn Ser Gly Lys Lys Lys Lys Arg Lys Val Arg Gly Ser Gly Ala  
325 330 335

Ser Asn Ala Asn Ala Ser Thr Arg Glu Glu Thr Pro Pro Pro Glu Thr  
340 345 350

Ile Asp Pro Asp Glu Pro Thr Tyr Cys Val Cys Asn Gln Ile Ser Phe  
355 360 365

Gly Glu Met Ile Leu Cys Asp Asn Asp Leu Cys Pro Ile Glu Trp Phe

370

375

380

His Phe Ser Cys Val Ser Leu Val Leu Lys Pro Lys Gly Lys Trp Phe  
 385 390 395 400

Cys Pro Asn Cys Arg Gly Glu Arg Pro Asn Val Met Lys Pro Lys Ala  
 405 410 415

Gln Phe Leu Lys Glu Leu Glu Arg Tyr Asn Lys Glu Lys Glu Glu Lys  
 420 425 430

Thr

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 <212> DNA  
 <213> Drosophila melanogaster

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 tcgaagatgc gcgatattag ggagtccatc aacgaggcaa acgattcggg ggccaagaac 360  
 tgctgctgga acgtgtcact aaccggtctg ctgcgcagct ttaagatgaa cgtgtcccag 420  
 tttctacgcc gcatggagca ctggaattgg ctgacccaaa acgagaacac tttccagctg 480  
 gaggttgagg aactgcgttg tcgacttggg attacttcga cgctgctgcg gcattataag 540  
 cacatctttc ggagcctggt cggtcaccgc gcaaggggtg ggacccgggt gccgcgaatc 600  
 actaccaagc gctgtatgag ttcgggttgg tgctcttcct ggtcattcgc aacgagttac 660  
 ccggttttgc gattacaaac ctgatcaacg gctgtcaggt gctcgtttgc acaatggatc 720  
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<400> 22

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Ile Arg Arg Glu Phe Ser Gly Val Pro Lys Asn Trp Asp Thr Glu Asp  
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Phe Asn Pro Ile Leu Leu Asn Lys Tyr Ser Val Leu Glu Ala Leu Gly  
35 40 45

Glu Leu Ile Pro Glu Leu Pro Ala Lys Gly Val Val Gln Met Lys Asn  
50 55 60

Ala Phe Phe His Lys Ala Leu Ile Met Leu Tyr Met Asp His Ser Leu  
65 70 75 80

Val Gly Asp Asp Thr His Met Arg Glu Ile Ile Lys Glu Gly Met Leu  
85 90 95

Asp Ile Asn Leu Glu Asn Leu Asn Arg Lys Tyr Thr Asn Gln Val Ala  
100 105 110

Asp Ile Ser Glu Met Asp Glu Arg Val Leu Leu Ser Val Gln Gly Ala  
115 120 125

Ile Glu Thr Lys Gly Asp Ser Pro Lys Ser Pro Gln Leu Ala Phe Gln  
130 135 140

Thr Ser Ser Ser Pro Ser His Arg Lys Leu Ser Thr His Asp Leu Pro  
145 150 155 160

Ala Ser Leu Pro Leu Ser Ile Ile Lys Ala Phe Pro Lys Lys Glu Asp  
165 170 175

Ala Asp Lys Ile Val Asn Tyr Leu Asp Gln Thr Leu Glu Glu Met Asn  
180 185 190

Arg Thr Phe Thr Met Ala Val Lys Asp Phe Leu Asp Ala Lys Leu Ser  
195 200 205

Gly Lys Arg Phe Arg Gln Ala Arg Gly Leu Tyr Tyr Lys Tyr Leu Gln  
210 215 220

Lys Ile Leu Gly Pro Glu Leu Val Gln Lys Pro Gln Leu Lys Ile Gly  
225 230 235 240

Gln Leu Met Lys Gln Arg Lys Leu Thr Ala Ala Leu Leu Ala Cys Cys  
245 250 255

Leu Glu Leu Ala Leu His Val His His Lys Leu Val Glu Gly Leu Arg  
260 265 270

Phe Pro Phe Val Leu His Cys Phe Ser Leu Asp Ala Tyr Asp Phe Gln  
275 280 285

Lys Ile Leu Glu Leu Val Val Arg Tyr Asp His Gly Phe Leu Gly Arg  
290 295 300

Glu Leu Ile Lys His Leu Asp Val Val Glu Glu Met Cys Leu Glu Ser  
305 310 315 320

Leu Ile Phe Arg Lys Ser Ser Gln Leu Trp Trp Glu Leu Asn Gln Arg  
325 330 335

Leu Pro Arg Tyr Lys Glu Val Asp Ala Glu Thr Glu Asp Lys Glu Asn  
340 345 350

Phe Ser Thr Gly Ser Ser Ile Cys Leu Arg Lys Phe Tyr Gly Leu Ala  
355 360 365

Asn Arg Arg Leu Leu Leu Leu Cys Lys Ser Leu Cys Leu Val Asp Ser  
370 375 380

Phe Pro Gln Ile Trp His Leu Ala Glu His Ser Phe Thr Leu Glu Ser  
385 390 395 400

Ser Arg Leu Leu Arg Asn Arg His Leu Asp Gln Leu Leu Leu Cys Ala  
405 410 415

Ile His Leu His Val Arg Leu Glu Lys Leu His Leu Thr Phe Ser Met



420

425

430

Ile Ile Gln His Tyr Arg Arg Gln Pro His Phe Arg Arg Ser Ala Tyr  
 435 440 445

Arg Glu Val Ser Leu Gly Asn Gly Gln Thr Ala Asp Ile Ile Thr Phe  
 450 455 460

Tyr Asn Ser Val Tyr Val Gln Ser Met Gly Asn Tyr Gly Arg His Leu  
 465 470 475 480

Glu Cys Ala Gln Thr Arg Lys Ser Leu Glu Glu Ser Gln Ser Ser Val  
 485 490 495

Gly Ile Leu Thr Glu Asn Asn Phe Gln Arg Ile Glu His Glu Ser Gln  
 500 505 510

His Gln His Ile Phe Thr Ala Pro Ser Gln Gly Met Pro Lys Trp Leu  
 515 520 525

Leu Leu Gln Ser Ser Thr Phe Ile Ser Arg Arg Ile Thr Thr Phe Leu  
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Ala Lys Leu Ala Gln Arg Lys Ala Cys Cys Phe Glu  
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<400> 23

Arg Ile Cys Ser Cys Pro Lys Arg Asp  
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<210> 24  
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Lys Ile Cys Ser Cys Pro Lys Arg Asp  
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<210> 25  
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<400> 25

Arg Val Cys Ser Cys Pro Lys Arg Asp  
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<210> 26  
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<400> 26

Lys Val Cys Ser Cys Pro Lys Arg Asp  
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<210> 27  
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<400> 27

Arg Ile Cys Thr Cys Pro Lys Arg Asp  
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<210> 28  
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<400> 28

Lys Ile Cys Thr Cys Pro Lys Arg Asp  
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<210> 29  
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<400> 29

Arg Val Cys Thr Cys Pro Lys Arg Asp  
1 5

<210> 30  
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<212> PRT  
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<400> 30

Lys Val Cys Thr Cys Pro Lys Arg Asp  
1 5

<210> 31  
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<223> "X" is any amino acid

<400> 31

Phe Xaa Cys Lys Asn Ser Cys  
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<210> 32  
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<400> 32

Phe Xaa Cys Gln Asn Ser Cys  
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